

## PLATE 7.

Fig. A. Adult female of *Tryphon incestus*, with outline of lateral view.

Fig. B. First-stage larva of *Anisoctenion alacer*, dorsal view.

Fig. C. Head of *Anisoctenion alacer*, ventral view, showing arrangement of setae.

Fig. D. First-stage larva of *Exenterus coreensis*, dorsal view.

Fig. E. First-stage larva of *Tryphon incestus*, dorsal view.

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## THE UBIQUITOUS MITE, A NEW SPECIES ON CITRUS.

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In the course of observations made over a period of years in citrus orchards in California, the author has seen very frequently a rather minute mite which moves about actively on the foliage. It is only comparatively recently that he has critically studied its anatomy and paid some attention to its habits.

It was learned rather early that this eupodid mite (*Tydeus ubiquitous* sp. nov.) is not phytophagous, but that its food consists of other insects present on the foliage. The question as to whether this mite functions as a predator or as a scavenger has been rather a difficult matter to determine. The occasional finding of the mite under mature reproducing scales at first encouraged the belief that it might be a true predator. Through lack of sufficient evidence to the contrary, however, the conclusion has been reached that the ubiquitous mite confines its feeding chiefly to the dead bodies of insects and to lifeless eggs. Hundreds of live and dead soft-brown and gray citrus scales have been examined critically for the presence of these mites. They are very commonly found associated with dead scales, but I have yet to observe them actually feeding on living insects.

Various species of *Tydeus* have been credited with being predatory on scale insects and their eggs. Among these are *T. gloveri* Ashm. and *T. coccophagus* Ewing. Ashmead<sup>1</sup> believed that the former feeds upon eggs of the oval scale. Ewing and Webster<sup>2</sup> state that *T. coccophagus* Ewing is of some importance as an enemy of the oyster-shell scale in Iowa. Banks<sup>3</sup> also records that *T. gloveri* Ashm. "feeds on the young and eggs of

<sup>1</sup>Ashmead, W. H. Injurious and Beneficial Insects Found on the Orange Trees of Florida. *Canad. Ent.* 11:159-160 (1879).

<sup>2</sup>Ewing, H. F. New Predaceous and Parasitic Acarina. *Psyche* 18: 37-43, illus. (1911).

<sup>3</sup>Banks. The Acarina or Mites, U. S. Dept. Agr. Rept. 108, 153 pp., illus. 1915). (See p. 21.)

scale insects." Tothill<sup>4</sup> states that the latter species is found under old scales, but believes that it plays little part in the control of this scale. He expresses the opinion that *T. coccophagus* Ewing is identical with Ashmead's old species, *T. gloveri*. Miller,<sup>5</sup> in his work on the Acarina of Ohio, says that "A species of *Tydeus* is of no little economic importance from its habit of preying upon the oyster-shell scale." He does not identify the species.

There appears to be no previous record of the occurrence of any species of *Tydeus* on citrus in California. However, in 1879 Ashmead<sup>6</sup> described a species (*T. gloveri*) on citrus in Florida, and stated that it was "found in company with the oval scale insect (*Aspidiotus citricola*) on the eggs of which it probably feeds."

Living healthy scales are almost invariably so tightly appressed to the plant substratum that it is impossible for mites of the size of *Tydeus* to crawl under them. However, individual scales that have been weakened by one cause or another, or which are harboring masses of eggs or young, are frequently loosened sufficiently from the plant surface to permit the mites to gain entrance to the space beneath them. *Tydeus ubiquitous* has thus been seen under such mature individuals both of the gray and the soft-brown scales, and developmental activity on the part of the mites has been observed in these locations. In fact these mites appear by preference to breed within the cavities formed by scale shells, but also rear their little colonies entirely in the open. Colonies have been observed under and adjacent to dead bodies of cottony-cushion scale, citrus thrips, spiders, etc.

The ubiquitous mite is an active species. One frequently sees it running about on the citrus foliage and at times on the fruit. Of all animals, this mite is probably the one most generally abundant on citrus foliage in California. The stalked eggs are placed in every conceivable location on the tree, but usually most commonly in the immediate vicinity of dead scales. It is rather common to see them actually attached to the shells of dead scales. In the immediate vicinity of scale insects the eggs at times are so thick as to resemble a forest of stalks. As previously noted, the cavity within the dead scale shells is the favorite breeding place, and as many as 20 to 30

<sup>4</sup>Tothill, J. D. Some Notes on the Natural Control of the Oyster-shell Scale (*Lepidosaphes ulmi*, L.). Bul. Ent. Research 9: 183-196, illus. (1919). (See p. 195.)

<sup>5</sup>Miller, A. E. An Introductory Study of the Acarina, or Mites, of Ohio. Ohio Agr. Expt. Sta. Bul. 386, pp. 85-172, illus. (1925.) (See p. 92.)

<sup>6</sup>Ashmead, W. H. Injurious and Beneficial Insects Found on the Orange Trees of Florida. Canad. Ent. 11: 159-160 (1879).

cast mite skins are often seen under a single scale. The cast skins are always on the surface of the plant—not on the scales. As many as six *Tydeus* mites have been seen under a scale, and mating takes place in these cavities. Just as in the case of red spiders, the males hover around the quiescent deutonymphs which are soon to molt to females. Several males compete for a single female.

The following table indicates the association of the *Tydeus* mite with scale insects:

TABLE I.—*Tydeus mites found associated with scale insects in Tulare County, California.*

|             | Number of scales examined | Number of scales harboring <i>Tydeus</i> mites | Per cent of scales harboring mites | Greatest number of live mites per colony |
|-------------|---------------------------|--|------------------------------------|--|
| Dead scales | 300                       | 111  | 37.0                               | 6 <sup>2</sup>                           |
| Live scales | 200 <sup>1</sup>          | 0  | 00.0                               | 0  |

<sup>1</sup>Note: The live scales examined were all immature.

<sup>2</sup>As many as 17 overwintering mites have been seen under one scale.

The description of the ubiquitous mite follows:

***Tydeus ubiquitous*, new species.**

Small soft-bodied mites, female about 0.225 mm. long. Color, pale slaty-amber to pearl-lavender, a paler narrow stripe of smoky-pearl-lavender color extending dorsally along median line from cephalothorax to hind end (this stripe evidently a generic character); legs colorless. Body widest across anterior region of abdomen; as viewed dorsally the body margin is distinctly indented behind the shoulders, this being more accentuated in the male than in the female. About 24 bristles, distributed dorsally as follows: one at each postero-lateral corner of the cephalothorax, a very weak pair medially just in front of the suture which sharply separates the cephalothorax from the abdomen, a very strong pair antero-laterad of the latter, a transverse series of four evenly distributed just behind the suture, eight arranged in a double longitudinal series along the posterior half of the abdomen, a weak and a stronger pair near the hind end, and a sublateral pair just before the latter. Legs sparingly supplied with shortish pale hairs. Three weakly defined annular segments at hind portion of abdomen. Palpi simple, four-jointed, second joint longest, penultimate joint shortest, slightly exceeding the mandibles, which are moderately stout and tapering. Legs moderately long but all shorter than body; all but first pair having tapering tarsi with weakly hooked terminal pair of claws and a narrowly elliptical pulvillus; tarsi of forelegs much shorter, not narrowed distally, and entirely void of the claws and pulvillus. Relative lengths of joints

of foreleg as follows: coxa, 18; trochanter, 15; femur, 27; patella, 14; tibia, 14; tarsus, 13. Male distinctly smaller than female and with abdomen more narrowed behind. Egg elliptical, pale greenish-amber, borne on a long filamentous stalk.

*Type slide*.—Cat. No. 1048, U. S. N. M.

The type material is from Lindsay, California, November 28, 1931, from foliage of citrus trees.

Rather universally distributed in citrus orchards throughout California. Occurring also on various other wild and cultivated plants.

The species described herein is possibly closest to *T. gloveri* Ashm., from which it may readily be separated by the characteristics given below.

*T. gloveri*: Body oval, flattened; color pale yellow with a broad pinkish-flesh-colored stripe medially on dorsal aspect of abdomen extending to posterior tip; hind tip of abdomen obtuse; legs thin, with two claws.

*T. ubiquitous*: Body strongly subpyriform, not flattened; color pale slaty-amber (large individuals at times pearl-lavender), with a narrow stripe of smoky pearl-lavender dorsally along median line beginning at a point on cephalothorax just before the transverse suture and fading to obscurity somewhat before the hind margin of abdomen; hind tip of abdomen sharply rounded; legs thickish, the first pair devoid of terminal appendages, other three pairs each with a pair of hooked claws and a prominent pulvillus.

*T. ubiquitous* is distinguished from *T. coccophagus* Fwing by the differences mentioned below.

*T. coccophagus*: Hyaline in color (no mention of the dorsal median abdominal stripe); 4 pairs of dorsal body bristles; first pair of legs slightly longer than others; hind pair of legs barely reaching tip of abdomen; tarsus one-and-one-half times as long as tibia; tibia one-and-one-half times as long as patella, body length, 0.20 mm.

*T. ubiquitous*: Pale slaty-amber to pearl-lavender in color, with a narrow median stripe of smoky-pearl-lavender; 12 pairs of dorsal body bristles; first pair of legs not longer than others; hind pair of legs reaching much beyond tip of abdomen; tarsus of legs I hardly equaling tibia; tibia merely equaling patella; body length, 0.225 mm.

#### EXPLANATION OF PLATE 8.

##### *Tydeus ubiquitous* McGregor.

Fig. 1, dorsal view of male; Fig. 2, distal portion of leg I, showing tarsal bristles; Fig. 3, terminal tarsal appendages of other legs; Fig. 4, egg with stalk attached to tip of leaf, Fig. 5, mandible, lateral view; Fig. 6, lateral view of female with legs partly amputated.

